

WHAT WE CLAIM IS:

1. A method of sowing a heterotrophic somatic plant embryo or germinant of a conifer species to facilitate growth of the embryo or germinant into an autotrophic seedling, which method comprises the following steps:

providing a nutrient medium comprising particles of a solid component contained within a flowable component containing water and a carbohydrate nutrient for the embryo or germinant, said flowable component being selected from the group consisting of a fluid and a semi-solid;

dispensing a quantity of the nutrient medium onto a surface of a porous solid growth substrate for the somatic plant embryo or germinant and contacting said plant embryo or germinant with said nutrient medium; and

exposing said embryo or germinant to environmental conditions effective for growth into an autotrophic seedling;

wherein at least said dispensing, contacting and exposing steps are carried out *ex vitro* in non-sterile conditions; and

wherein said particles forming said solid component are adapted to remain in contact with said embryo or germinant after said flowable component undergoes dissipation in said environmental conditions, thereby providing continuing physical support for said embryo or germinant after said dissipation.

2. The method of claim 1, which comprises employing, as said flowable component, a material having a viscosity that causes at least some of said flowable component containing the carbohydrate nutrient to remain in contact with said embryo or germinant until said embryo or germinant commences autotrophic growth under said environmental conditions.

3. The method of claim 1, which comprises employing, as said nutrient medium, a medium that has a fluidity under said environmental conditions that enables the nutrient medium to be dispensed under gravity or pressure from an orifice onto said porous solid growth substrate.

4. The method of claim 1, wherein said somatic plant embryo or germinant is contacted with said nutrient medium after said nutrient medium has been dispensed onto said surface of the porous growth substrate.
5. The method of claim 1, wherein said somatic plant embryo or germinant is contacted with said nutrient medium before said nutrient medium has been dispensed onto said surface of the porous growth substrate.
6. The method of claim 1, wherein said somatic plant embryo or germinant is contacted with said nutrient medium as said nutrient medium is dispensed onto said surface of the porous growth substrate.
7. The method of claim 1, wherein said somatic plant embryo or germinant is contacted with said nutrient medium in such a way that part of said somatic plant embryo or germinant remains uncoated with said nutrient medium.
8. The method of claim 1, wherein said porous solid growth substrate is in the form of a body provided with a depression formed in said surface, and wherein said nutrient medium is dispensed into said depression.
9. The method of claim 8, wherein said embryo or germinant is at least partially inserted into said depression in contact with said nutrient medium.
10. The method of claim 1, wherein said embryo or germinant, when contacted with said nutrient medium, is naked.
11. The method of claim 1, wherein said solid component of said nutrient medium comprises generally equi-axial particles.

12. The method of claim 1, wherein said solid component of said nutrient medium comprise elongated particles.
13. The method of claim 12, wherein said elongated particles comprise flexible fibers.
14. The method of claim 13, wherein said fibers are made of alpha-cellulose.
15. The method of claim 14, wherein said nutrient medium contains methylcellulose, agar, agarose, phytagel, gellan gum or gelcarin either singly or in combinations of two or more of the aforementioned gelling agents.
16. The method of claim 1, wherein said solid component of said nutrient medium comprises milled or sifted peat moss, perlite, vermiculite, clay, diatomaceous earth, coir or silica either singly or in combinations of two or more of the aforementioned components.
17. The method of claim 16, wherein said nutrient medium contains methylcellulose, agar, agarose, phytagel, gellan gum or gelcarin either singly or in combinations of two or more of the aforementioned gelling agents.
18. The method of claim 1, wherein said flowable component of said nutrient medium is a fluid comprising a viscous liquid containing said carbohydrate nutrient in a dissolved form.
19. The method of claim 1, wherein said flowable component of said nutrient medium is a semi-solid comprising a flowable gel containing said carbohydrate in dissolved form.
20. The method of claim 1, wherein said nutrient medium additionally comprises at least one material selected from the group consisting of mineral compounds, vitamins, amino acids, plant growth regulators and pest control compounds.

21. The method of claim 1, wherein said carbohydrate nutrient is a monosaccharide.
22. The method of claim 21, wherein said monosaccharide is selected from the group consisting of glucose and fructose.
23. The method of claim 1, wherein said carbohydrate nutrient is an oligosaccharide.
24. The method of claim 23, wherein said oligosaccharide is selected from the group consisting of sucrose, maltose, raffinose, and stachyose.
25. The method of claim 1, wherein said carbohydrate nutrient is a combination of monosaccharides, a combination of oligosaccharides or a combination or monosaccharides with oligosaccharides.
26. The method of claim of 25, wherein said monosaccharides are selected from the group consisting of glucose and fructose, and said oligosaccharides are selected from the group consisting of sucrose, maltose, raffinose, and stachyose.
27. The method of claim 1, wherein said carbohydrate nutrient is sucrose present in the nutrient medium in an amount in the range of in the range 1 and 10% (w/v).
28. The method of claim 1, wherein said carbohydrate nutrient is maltose present in the nutrient solution in an amount in the range of in the range 1 to 10% (w/v).
29. The method of claim 1, wherein said solid component is biologically inert.
30. The method of claim 1, wherein said embryo or germinants are from the family Pinaceae.
31. The method of claim 1, wherein said embryo or germinants are of tree species selected from the group consisting of Loblolly pine, Radiata pine, spruce and Douglas fir.

32. A method of growing an autotrophic seedling from a somatic plant embryo or germinant of a conifer species, which method comprises the following steps carried out *ex vitro* in non-sterile conditions:

providing a nutrient medium comprising particles of a solid component present within a flowable component, said flowable component being selected from the group consisting of an aqueous fluid and an aqueous semi-solid, containing a carbohydrate nutrient for the embryo or germinant;

dispensing a quantity of the nutrient medium onto a surface of a porous solid growth substrate for the somatic plant embryo or germinant held in a container;

contacting said plant embryo or germinant with said nutrient medium; and

subjecting said embryo or germinant to environmental conditions to further growth and development into an autotrophic conifer seedling;

wherein said nutrient medium has a cohesiveness such that at least some of said fluid or semi-solid containing the carbohydrate nutrient remains in contact with said embryo or germinant as said embryo or germinant proceeds to develop under environmental conditions effective for said development; and

wherein said particles of the solid component are adapted to remain in contact with said embryo or germinant after of said flowable or semi-solid material dissipates under said environmental conditions, thereby providing continuing physical support for said embryo after said dissipation.

33. A nutrient medium for a somatic plant embryo or germinant of a conifer species, which medium comprises particles of a solid component present within an aqueous flowable component comprising a flowable or semi-solid component containing a carbohydrate nutrient for the embryo or germinant, wherein said nutrient medium has a viscosity such that, when contacted with said embryo or germinant, at least some of said flowable or semi-solid component containing the carbohydrate nutrient remains in contact with said embryo or germinant as said embryo or germinant proceeds to grow and convert to an autotrophic seedling under environmental conditions effective for said conversion, and wherein said particles of the solid component of the nutrient medium

remain in contact with said embryo or germinant after said flowable or semi-solid material dissipates, thereby providing continuing physical support for said embryo or germinant after said dissipation.

34. The medium of claim 33, which comprises employing, as said nutrient medium, a medium that has a fluidity under said environmental conditions such that it may be dispensed under gravity or pressure from an orifice onto said porous solid growth substrate.

35. The medium of claim 33, wherein said solid particles comprise flexible or elongated fibers.

36. The medium of claim 35, wherein said fibers are made of alpha-cellulose.

37. The medium of claim 36, wherein said fibres are present in a concentration range up to 10% (w/v).

38. The medium of claim 36, wherein said fibers are present in the range between 3 and 8% (w/v).

39. The medium of claim 36, wherein said medium also contains methyl-cellulose, agar, agarose, phytigel, gellan gum, or gelcarin either singly or in combinations of two or more of the aforementioned gelling agents.

40. The medium of claim 39, wherein the methyl-cellulose, agar, agarose, phytigel, gellan gum or gelcarin concentrations in the nutrient medium ranges between 0 and 6% w/v.

41. The medium of claim 33, wherein said solid component comprises milled or sifted peat moss, perlite, vermiculite, clay, diatomaceous earth, coir, or silica either singly or with 2 or more of the aforementioned solid components combined.

42. The medium of claim 41, wherein said solid components are present, either singly or with two or more of the solid components used in combination, in a concentration range up to a total of 0.5 to 10% w/v.
43. The medium of claim 41, wherein said medium also contains methyl-cellulose, agar, agarose, phytigel, gellan gum, or gelcarin either singly or in combinations of two or more of the aforementioned gelling agents.
44. The medium of claim 43, wherein the methyl-cellulose, agar, agarose, phytigel, gellan gum or gelcarin concentrations in the nutrient medium ranges between 0 and 6% w/v.